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DAVID E. GASKIN. — The genus *Roxita* Blezynski (Lepidoptera, Pyralidae, Crambinae): new species and combinations and a reappraisal of its relationships, pp. 17—31, figs. 1—23.

THE GENUS *ROXITA* BLESZYNSKI (LEPIDOPTERA, PYRALIDAE, CRAMBINAE): NEW SPECIES AND COMBINATIONS AND A REAPPRAISAL OF ITS RELATIONSHIPS

by

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ABSTRACT

The Indo-Oriental genus *Roxita* Bleszynski is redefined. Four new species, *apicella*, *fletcheri*, *mululella* and *reductella* are described. *Modestia* Bleszynski is a synonym of *Roxita* and the two species *M. szetschwanella* (Caradja) and *M. bipunctella* (Wileman & South) are transferred to *Roxita*, as is *Diptychophora adpersella* Snellen. Bleszynski concluded that *Modestia* (= *Roxita*) was closely allied to *Paveromene* Osthelder (Crambinae, Diptychophorini); in fact the genitalia of both sexes show many characters linking them to *Corynophora* Berg and *Tawhitia* Philpott (Crambinae, Crambini, Corynophorina). The zoogeography of *Roxita* is briefly discussed.

INTRODUCTION

In 1963 Bleszynski established the monotypic genus *Roxita* to accommodate a new species *eurydyce*, based on the series (two specimens) of *Culladia szetschwanella* f. *modesta* Caradja & Meyrick (1933: 140, nomen nudum). Later he described a new genus *Modestia* Bleszynski (1965: 64) and transferred *szetschwanella* proper to that genus from *Culladia* Moore, designating a male of the syntypic series (5 males, 1 female) as a lectotype. Previously (1963: 28) he has synonymized *Crambus modestellus* Caradja (praeocc. by *Crambus modestellus* Barnes & McDunnough, 1918) with *szetschwanella*. He also commented (1965: 65) that f. *modesta* was either a nomen nudum or an incorrect spelling of *modestellus*, and indicated that "... the specimens listed as f. *modesta* belonged to a totally different genus and species which he planned to describe later" (my quotes, from translation). It is quite evident he had forgotten that he had already described these specimens as the type of *Roxita eurydyce* (1963: 176), and also failed to recognize that they were members of the same genus as *szetschwanella*.

The latter error was particularly puzzling until Mr. Michael Shaffer of the British Museum of Natural History obtained the type series from the Muzeul G. Antipa in Bucharest for the author, and observed that the female was a damaged and undescribed species of *Glaucobaris*

Meyrick. It seems likely that Bleszynski was misled in his conclusions about the status of f. *modesta* by the genitalia of this misidentified specimen.

Further comparative studies and a search of the British Museum collections in close cooperation with Mr. Shaffer led to the conclusion that both described species of *Modestia*, *M. szetschwanella* (Caradja) and *M. bipunctella* (Wileman & South) should be transferred to *Roxita*, that *Modestia* was a synonym of *Roxita*, that *Diptychophora adpersella* Snellen should also be transferred to *Roxita*, and that four previously undescribed species *apicella* n. sp., *fletcheri* n. sp., *mululella* n. sp. and *reductella* n. sp. should also be assigned to *Roxita*. All seven species are rather small, yellowish or brownish crambine moths, with or without fasciae, 10–17 mm in wingspan, which could be confused with several diptychophorine genera on the basis of external appearance. They were therefore of considerable interest to the author, who is revising the world Diptychophorini. The genitalia of the known females of *Roxita* sp. however, are quite distinctively corynophorine, with an external limen formed by fusion of the lamellae ante- and postvaginales, so that the extremity of the antrum protrudes. Nor is the structure of the male valvae at all characteristic of the quadrate form (with undeveloped sacculus) typical of *Glaucobaris* and most other diptychophorine

genera. On the basis of the former morphology alone *Roxita* must be excluded from the Diptychophorini, as defined by Gaskin (1971).

The subtribe Corynophorina, previously known only from Australia and New Zealand (Gaskin, 1975: 376) has its distribution greatly extended by the addition of *Roxita* to the two genera previously assigned, *Corynophora* Berg and *Tawhitia* Philpott. The distribution of *Roxita* itself may be extended by future discoveries, but at present appears to be exclusively Indo-Oriental.

Roxita exhibits several specialized features in addition to loss of forewing m_1 ; the most significant of these is atrophy of the juxta in most species. In *Tawhitia* species the juxta is retained, and the saccus of the male has a characteristic ventral flap. The anal papillae of female *Tawhitia* are fused distally to form a "dutch clog-shaped" structure. *Corynophora* is decidedly more primitive than either of the above genera; the anal papillae are barely fused distally, the corpus bursae bears unmodified signa reminiscent of those found in generalized Crambina, the evagination of the sterigmal sclerites is rudimentary (albeit present) in contrast to the condition in the other genera, and in the male the narrowing of the valva and the segregation and elaboration of the costal region has not progressed far. The uncus, gnathos, sacculus and ventral region of the valvae however, are essentially the same structures found in other genera. The morphology of the venation and genitalic structures in both sexes provides strong evidence for common ancestry.

The Corynophorina present an interesting zoogeographical problem. One of the alternative hypotheses put forward by Gaskin (1975: 274) concerning the evolution of Crambini was the postulation of southern origin. The Corynophorina were believed to have been isolated in Australia and New Zealand, while the Crambina, with a less restricted Gondwanic distribution, avoided this isolation and were able to colonize tropical grasslands and eventually the temperate grasslands of the northern hemisphere. Obviously, while southern origin remains a strong possibility, the corynophorine isolation hypothesis must now be re-assessed. Two alternatives present themselves; 1) Were the Corynophorina more widely dispersed in the southern hemisphere before the separation of Australia from Antarctica than previously thought? or 2) Is the present distribution the re-

sult of extension of range from Australia into southern Asia in the late Tertiary, with subsequent isolations leading to further speciation?

The former appears most likely, for several reasons. True Australian faunal elements appear to have had little success colonizing the tropics to the north of the continent, except for penetrations into New Guinea. The most primitive genus of the Corynophorina, *Corynophora* itself, has survived, like so many other relict groups, in isolation in Australia. Modification of the basic corynophorine plan in the more specialized genus *Tawhitia* could well be related to this genus being distributed in the extreme southeast of Australia and in southern New Zealand, areas which have had more radical late Tertiary geomorphological and climatic histories than much of subtropical and warm-temperate eastern Australia (see Fleming, 1962, 1963a, b, for example) and hence perhaps experienced more rigorous selection pressures.

Both *Tawhitia* and *Roxita* possess characters obviously apomorphic with respect to *Corynophora*, but they are not the same characters, suggesting segregated radiation over a long period. The valval elaborations in *Roxita* are quite characteristic, and the juxta has become atrophied. In *Tawhitia* the latter structure has become rather strong and complex. While *Corynophora* so far is known only from Australia, one species of *Tawhitia* is endemic to the alpine habitat of the South Island of New Zealand. The New Zealand alpine (*T. glaucophanes* Philpott) may well be a relict derivative of ancient eastern Gondwanic stock; the other species (*T. pentadactyla* (Zeller)) on the other hand, is so close to the Australian form that colonization in or even since Quaternary time has to be a distinct possibility.

Corynophorines seem to be absent from Africa and South America, yet common to all major geographic zones of the Indo-Australasian/Oriental regions. It seems reasonable therefore, to assume that the segregation, speciation and dispersal of *Roxita* occurred in the northern Gondwanic periphery, i.e. what is now the Malaysian-southern Oriental region, with subsequent colonization of India and Ceylon. It must not be overlooked however, that one of the least specialized members of the genus occurs in Sri Lanka. Absence of *Roxita* from South America, Africa, Australia and New Zealand tends to imply that its radiation has been a phenomenon of the middle to late Tertiary.

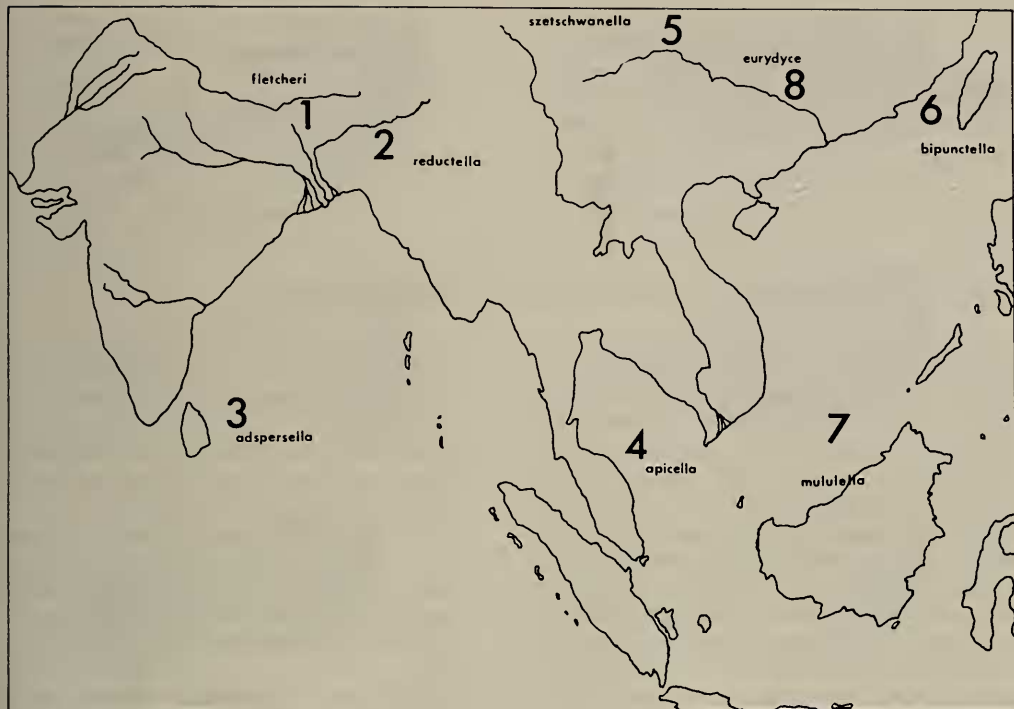


Fig. 1. Records of *Roxita* species. 1, *fletcheri* (southern Himalayas); 2, *reductella* (Khasia hills of Assam); 3, *adpersella* (Sri Lanka); 4, *apicella* (West Malaysia); 5, *szetschwanella* (western China); 6, *bipunctella* (Taiwan); 7, *mululella* (East Malaysia); 8, *eurydyce* (southern China).

ary period, well after the separation of the major continental elements of the Gondwanic complex.

Within *Roxita* itself three distinct species groups can be recognized. Differences in size and habitus are at first sight rather extreme in this genus, but are in fact no greater than those found within *Orocrambus* Purdie of New Zealand (Gaskin, 1975). The closest relationship is that between *apicella* and *mululella*, distributed in West and East Malaysia respectively (fig. 1), indicating a similar history to butterflies of "faunal element 1B" of this region (Holloway, 1973), and prompting speculation that the genus will be found in Sumatra as well, and possibly in the Lesser Sunda Islands, Celebes and the Philippines. The relationships of *reductella* cannot be determined without further material. The Oriental species *bipunctella* and *szetschwanella* of Taiwan and western China are closely related, as might be expected. The third group, containing *adpersella* of Sri Lanka, *fletcheri* of northern India and *eurydyce* of southeast China, is the most widely distributed. As might

be expected, although there are clear affinities between the species, these are not quite as close as those among the previous species pairs. As aforementioned, the Sri Lanka species is the most primitive of these three, in contrast to the usual situation where faunal elements of Sri Lanka and southern India are derivative with respect to northern India (Holloway, 1974).

Roxita Bleszynski

Type-species: *Roxita eurydyce* Bleszynski, 1963 (partim), by monotypy.

Roxita Bleszynski, 1963: 176.

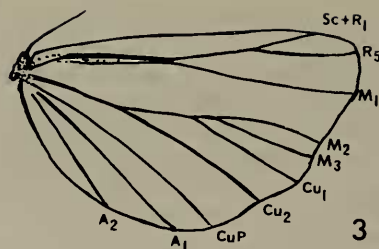
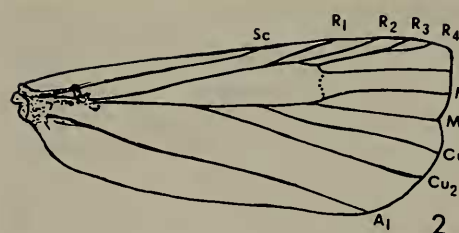
Modestia Bleszynski, 1965: 64. Type-species: *Culladia szetschwanella* Caradja, 1931, by monotypy.

New synonymy.

Revised description.

Terminology throughout descriptions follows Diakonoff (1954), Klots (1956) and Dugdale (1966). The abbreviation "LMB ratio" in the descriptions of male genitalia refers to length to medium breadth ratio of the aedeagus.

In forewings, Sc and r_1 separate, r_3 and r_4



Figs. 2, 3. Forewing (2) and hindwing (3) venation of typical *Roxita* species.

with common stalk, r_5 free, not stalked with r_4 as in Crambini, m_1 absent (fig. 2). In hindwings, m_2 , m_3 and cu_1 arising from common stalk, hindwing cell open (fig. 3). Male genitalia with valvae characteristically much tapered, folded, developed into prongs, lobes and/or setae, especially in costal region. Sacculus and ventral margin of valva may also be so developed. Female genitalia having lateral extremities of antrum fused with eighth tergite, which has much reduced anterior apophyses. Lamella antevaginalis (sterigmal sclerotization forming anterior lip of antrum) often drawn out into a spade-shaped external protrusion of the antrum which takes the form of a rather elongated, evaginated sclerotized tube (limen). Little or no modification of the posterior margin of the seventh sternite is involved. Corpus bursae usually asiginate; two elongate signa present in one species. Early stages not known.

KEYS TO THE SPECIES OF *ROXITA* BLESZYNSKI

A. External features

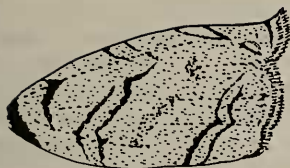
1. Ground colour of forewings dull buffish yellow 2
- Forewings brown, with or without horizontal or transverse dark-bordered whitish fascia 3
2. Ante- and postmedial fasciae represented by incomplete dark borders only (fig. 4) *apicella* n. sp.
- Ante- and postmedial fasciae white, dark-bordered (fig. 5) *mululella* n. sp.
3. Forewing brown, but devoid of antemedial fasciae of either type, with dark brown subterminal zone (fig. 6) *reductella* n. sp.
- Forewing brown; with or without white horizontal or transverse fasciae, subterminal zone same colour as rest of wing 4
4. Well-marked transverse fasciae on forewing; no trace of pale, horizontal fascia ... 5

- Well-marked or indistinct pale horizontal fascia on forewing, with or without transverse fascia 6
5. Antemedial fascia broad, white with thick chocolate brown distal margin, postmedial fascia not touching termen (fig. 7) *adpersella* (Snellen)
- Antemedial fascia tapering sharply from costa, becoming obsolete before dorsum except for thin dark distal streak; postmedial fascia touching termen in two places (fig. 8) *fletcheri* n. sp.
6. Apical zone of forewing yellowish ochre proximally, whitish distally. Dark-bordered, buff transverse fascia at about 0.3 from base (fig. 9) *eurydyce* Bleszynski
- Apical zone of forewing dark brown with white distal patch. No transverse fascia as described above 7
7. Apical zone of forewing dark except for narrow white terminal stripe (fig. 10) *szetschwanella* (Caradja)
- Apical zone of forewing dark, but with broad oval white zone against terminal margin (fig. 11) *bipunctella* (Wileman & South)

B. Male genitalia

(Male genitalia of *reductella* n. sp. not known)

1. Valva bearing long, curved costal setae ... 2
- No such costal setae present 3
2. Basal costal prong absent; setae flattened, apically expanded (fig. 12) .. *apicella* n. sp.
- Basal prong absent, setae tapered (fig. 14) ... *mululella* n. sp.
3. Only costal region of valva bearing protuberances 4
- Valva ventral margin folded, with elongate protuberance 6
4. Costa of valva with single apical prong (fig. 16) *adpersella* (Snellen)



4



5



6



7



8



9



10



11

Figs. 4—11. Forewing patterns of the species of *Roxita*. 4, *apicella*; 5, *mululella*; 6, *reductella*; 7, *adpersella*; 8, *fletcheri*; 9, *eurydyce*; 10, *szetschwanella*; 11, *bipunctella*.

- Costa of valva with basal and apical prongs 5
- 5. Apical prong of valval costa with short curved spur near its base; basal prong of costa very slender, and as long as apical prong (fig. 18)..... *fletcheri* n. sp.
- Apical region of valval costa lacking such a prong, robust basal prong considerably shorter than apical (fig. 15) *eurydyce* Bleszynski
- 6. Pyramidal costa, elongate, slender apical prong (fig. 20).... *szetschwanella* (Caradja)
- Costa only slightly arched, with broad, flattened apical prong, curved sharply dorso-introrsely (fig. 22) *bipunctella* (Wileman & South)

C. Female genitalia

(Female genitalia of *eurydyce* and *reductella* not known)

1. Corpus bursae with two signa; "fatty"-looking subantral sac present (fig. 13) *apicella* n. sp.
- Corpus assignate, no such sac present 2
2. Strong fusion between base of antral region and anterio-lateral angles of eighth tergite. Antrum without lateral extensions, apically spatulate 3
- Weak fusion between antral base and eighth tergite. Antrum with lateral extensions ... 4
3. Ductus bursae about $3.5 \times$ length of posterior apophyses (fig. 17) *adpersella* (Snellen)

- Ductus bursae about $6 \times$ length of posterior apophyses (fig. 19) *fletcheri* n. sp.
- 4. Antral region with slight lateral extensions (fig. 21) *szetchwanella* (Caradja)
- Antral region with broad lateral "wing-like" extensions (fig. 23) *bipunctella* (Wileman & South)

Roxita adpersella
(Snellen, 1893) n. comb.
(figs. 7, 16, 17)

Diptychophora adpersella Snellen, 1893: 61, pl. 3 fig. 4.

Diptychophora adpersella Snellen; Bleszynski & Collins, 1962: 295.

External characters. — Labial palpi creamy-buff, $1.5 \times$ head length. Head whitish-buff, frons rounded. Thorax, legs and abdomen pale buff.

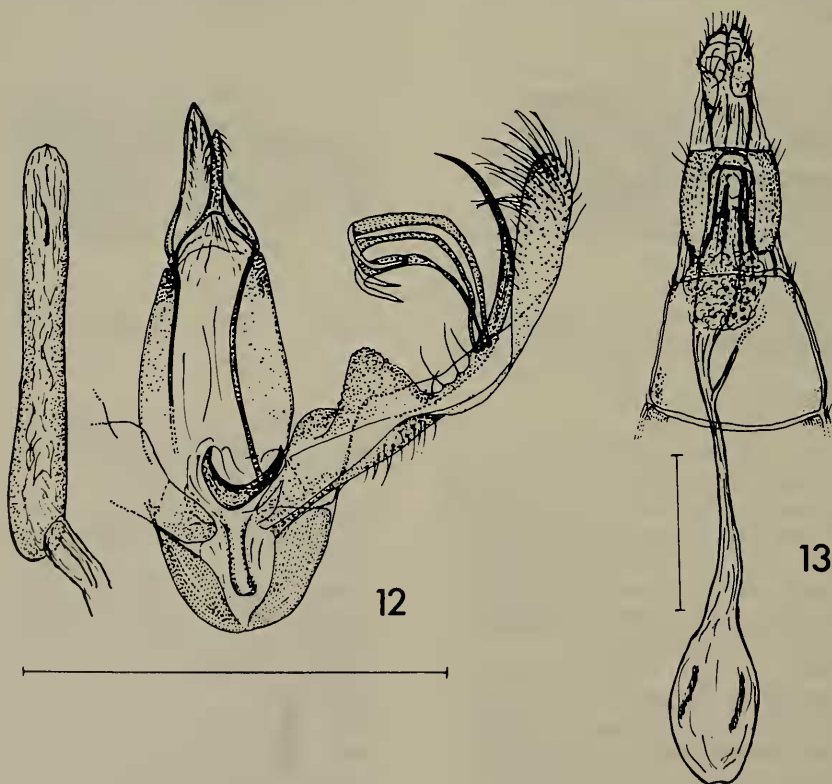
Forewings (fig. 7) with ground colour pale creamy buff. Basal fascia absent. Antemedial fascia dark brown, with pale proximal edging,

broad, waved, angled at about 0.2 with one or two "teeth" on distal side of angle, costal extremity yellow in some specimens. Basal half of wing clouded with dark brown in interneural spaces. Postmedial fascia (*not* touching terminal margin as in *fletcheri*) broad, silvery white, flanked proximally with "toothed" yellow margin, the "teeth" extending into the discal region with some grey scaling between them. Apical and terminal region plain buff, with a pair of black spots on the margin at 0.6 and 0.7 , flanked distally by small buff marks. Cilia bounded proximally by a thin, brown marginal fascia, themselves buff with brown tips. Ventral surface dull mid-brown.

Hindwings creamy white, or with apical brown shading, cilia pale buff with a dark terminal fascia. Ventral surfaces dull pale brown.

Expanse $10-12$ mm.

Male genitalia. — Fig. 16. Uncus strong, narrow, sharply pointed, curved steeply ventrad. Gnathos apically spatulate and lightly scobinate, lateral elements narrow. Tegumen weak, elong-



Figs. 12, 13. Male and female genitalia of *R. apicella*. In this and all subsequent genitalia drawings the indicated scale is 1 mm.

gate, basally narrowed. Vinculum absent, or indistinguishable from lateral wall of saccus. Saccus moderate, bluntly rounded, about $0.5 \times$ length of uncus. Juxta weak, rhomboidal. Valva about twice length of uncus, with strong demarcation of broad costal region. Costa terminating in a large, curved, strong apical prong, dorsad of which is a blunt lobe at termination of costal sector. Valva proper very elongate, tapered to point, with weak cucullus. Sub-basal part of valva has a weak elongate ridge which may represent demarcation of a distinct saccular region. Aedeagus massive, stout, LMB ratio about 5 : 1, lacking cornuti, but with sub-apical ridge at right angles to longitudinal axis.

Female genitalia. — Fig. 17. Anal papillae moderately sclerotized, free, about half length of posterior apophyses. Eighth abdominal tergite quite massive, about twice as long as anal papillae, fused in latero-ventral lines with margins of antrum. Anterior apophyses about $0.75 \times$ length of posteriors. Lamella postvaginalis forming a very strong dorsal roof to antrum; it is to this plate that the tergite margins fuse. Lamella antevaginalis forming a similar, but curved, apically spatulate plate, half of which projects some distance beyond the curved posterior margin of the seventh sternite. Ductus bursae about $3.5 \times$ length of posterior apophyses, with a "kink" in the partly recurved portion at about $0.3-0.4$, ductus seminalis junction obscure in available preparation, but apparently at about 0.4 . Corpus bursae asiginate.

Types. — Lectotype ♂, Sri Lanka (Ceylon), ("u.d.P."), genitalia preparation GS 6746; unpublished (?) designation by E. G. Munroe (label) (BMNH). Paralectotypes, 2 ♂, bearing original "u.d.P." labels, but additionally erroneously labelled "Pontiak W. Borneo (Andre)" (BMNH).

Material examined. — Ceylon, 2 ♂ "Ceylon" (Rothschild Bequest), no other data; 2 ♂, "Ceylon", 1892 (acq. Doncaster); 1 ♂, "Ceylon", 9—26 (Green coll.); 1 ♂, "Ceylon, R.07", 2 ♀ "Ceylon, 95—37" (1 in CNC, Ottawa); 1 ♀ "Putlam, Ceylon, C.F.H./96"; 1 ♀ Kegala, Oct. 1909, 4184 (Mackwood), genitalia prep. BM pyral. 14700; also 1 ♀, "4184" (presumably also a specimen from Kegala) (all in BMNH unless otherwise stated).

Remarks. — The life history is unknown, except that the flight period includes September and October. While the valval costa is charac-

teristically differentiated (fig. 16) it is of essentially simpler structure than in the other species. *R. adpersella* forms a rather discrete species subgroup with *R. fletcheri*; both are considerably smaller ($10-13$ mm) than other members of the genus and more closely related to *R. eurydyce* than any other species. Discovery of *adpersella* in India would not be surprising.

Roxita fletcheri new species

(figs. 8, 18, 19)

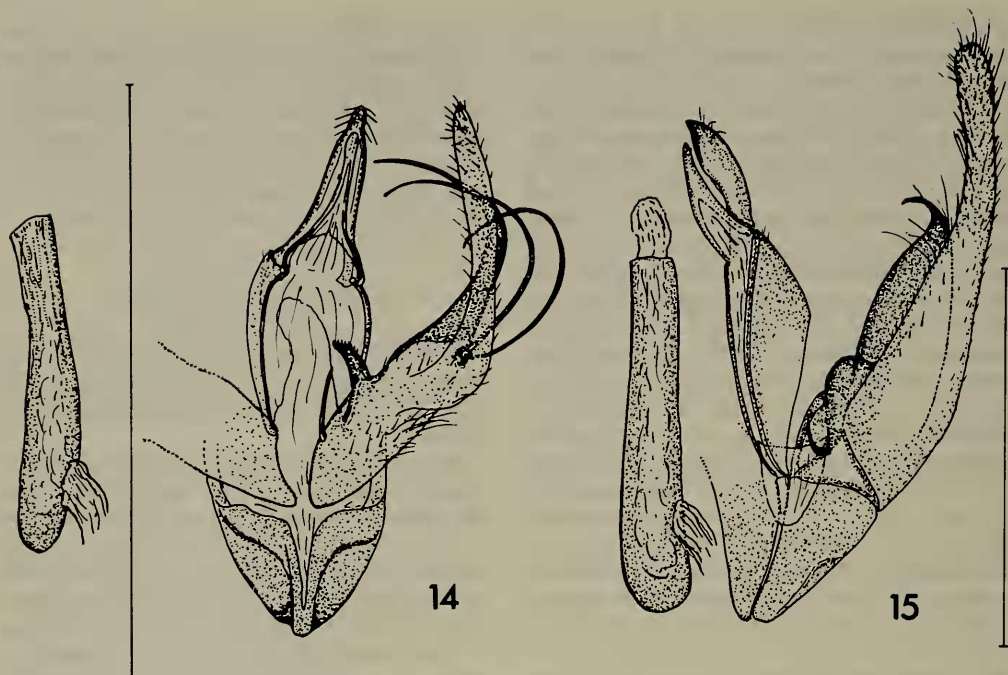
External characters. — Labial palpi $2 \times$ head length, whitish-scaled. Head whitish, frons rounded. Thorax creamy yellow, legs, abdomen similar.

Forewings (fig. 8) with grey ground colour, costa clouded basally with mid-brown. Basal fascia absent, antemedial fascia touching costa at about 0.6 , dark brown, rather indistinct, angled sharply at about 0.2 , the costal extremity marked distally with a small yellow bar. Discal region grey, with slight brown costal clouding, but penetrated from silvery white subterminal band by neural stripes of solid yellow scaling reaching central discal region. Post-medial fascia narrowly edged proximally by yellow, more thickly distally by blackish scaling. Outer margin of fascia sharply angled twice, touching the margin at about 0.3 and 0.7 (these angles are important features for distinguishing this species from *adpersella* on forewing pattern). Apical region and the two other marginal areas cut off by angles of postmedial fascia, all buff, with a pair of black marginal spots at 0.5 and 0.6 . Terminal extremity of apex bearing a wedge of golden brown scales. Ventral surface mid-greyish brown, with marginal and apical markings faintly repeated from dorsal surface.

Hind-wings mid-brown, slightly paler beneath, with sinuate termen.

Wing expanse $11-13$ mm.

Male genitalia. — Fig. 18. Uncus nearly straight in profile, narrow when viewed from below, apex sharply pointed. Gnathos only slightly shorter than uncus, apically rounded and slightly spatulate. Tegumen weak, narrow. Vinculum small, sub-triangular, with very strong margins. Saccus massive, tapered, apically rounded, about $1.25 \times$ length of uncus. Juxta a weak plate, more or less quadrate, but indeterminate in shape. Valva about $3.75 \times$ length of uncus, very elongate, narrow, apically rounded, with weak cucullus. Valval costa extending to about 0.5 of dorsal margin, with slender basal



Figs. 14, 15. Male genitalia of *R. mululella* (14) and *R. eurydyce* (15).

prong nearly length of uncus, and a pair of apical prongs at 0.6, one long, one short, both pointed, curved dorsad. Aedeagus about $0.8 \times$ length of valva, LMB ratio about 9 : 1, tubular, with single irregular sub-apical cornutus.

Female genitalia. — Fig. 19. Anal papillae relatively strong, free, somewhat tapered apically. Posterior apophyses about twice length of papillae. Eighth abdominal tergite strong, with ventro-lateral sterigmal extensions, fusing with lateral margins of antrum. Anterior apophyses reduced to short stubs. Lamella antevaginalis with strong, spatulate extension protruding beyond the posterior margin of the seventh sternite; lamella postvaginalis with a similar but much smaller extension as dorsal roof of antrum. Rest of both lamellae weaker, but staining intensely blue with chlorazol black. Ductus bursae lightly scobinate, $6 \times$ length of posterior apophyses (measured from posterior lip of antral shield), ductus seminalis joining at about 0.15. Corpus bursae asignate.

Types. — Holotype ♂, N. India, Himachal Pradesh, Dharmasala (32 14'N 76 24'E), 8.vii.59, genitalia prep. BM pyral. 14772 (BMNH). Paratypes: N. India, 1 ♂, Bhimtal to Mukto'sar,

5,000—6,000 ft., 11.ix.1923 (Fletcher) (BMNH). Nepal, 1 ♂ Bhimpedi, 400 m, 4—7.iv.1962 (G. Ebert and H. Falkner) SB 5792 (München). Sikkim, 1 ♂, 2,800 ft., vi.1895 (J. G. Pilcher) BM pyral. 7483 (BMNH); 1 ♀ Dikchu, 2,500 ft., 22.iv.1924 (R. W. G. Hingston) BM pyral. 14788 (BMNH).

Remarks. — This close relative (and apparent derivate) of *R. adpersella* is presently known from northern India, Sikkim and Nepal, and the flight period includes April, June, July and September. The early stages are unknown. It is clearly distinguishable from *adpersella* by the form of the postmedial fascia of the forewing, the complex spinose costa of the male valva, and the ventrally fused eighth abdominal tergite with short anterior apophyses in the female.

Roxita eurydyce Bleszynski (figs. 9, 15)

Roxita eurydyce Bleszynski, 1963: 176 (fig. 64, ♂ genitalia, but fig. 62, labelled ♀ genitalia, is a misidentification).

External characters. — Described from holotype male by Bleszynski (1963), accurately ex-

cept that the costal portion of the apical area of the forewing is yellow and the terminal zone white, not the reverse as in his description (fig. 9). True female of this species not known.

Male genitalia. — Fig. 15. As described and figured by Bleszynski (redrawn here for comparative purposes), but the basal process of the valval costa is smooth and slender, not stout as drawn by Bleszynski.

Type. — Holotype ♂, China, Lung-Tao-Shan, Kwangtung, 230 km from Canton, genit. prep. 2611-SB, Muzeul G. Antipa, Bucharest.

Remarks. — As indicated in the Introduction, the paratype female of the type series is in fact referable to the genus *Glaucocharis* Meyrick. The specimen is very damaged and does not merit description as a new species until more material is obtained. While *eurydyce* stands a little isolated from *szetschwanella* and *bipunctella* on one hand, and *apicella* and *mululella* on the other, the affinities in male genitalic characters with *fletcheri* and *adpersella* are striking. Bleszynski's statement (1963: 178) that the species was described from "two females" is obviously a simple typographic error.

***Roxita reductella* new species**
(fig. 6)

External characters. — Labial palpi about

$1.75 \times$ head length, buffish yellow. Head butt, frons rounded, thorax, legs, buff with yellow scales.

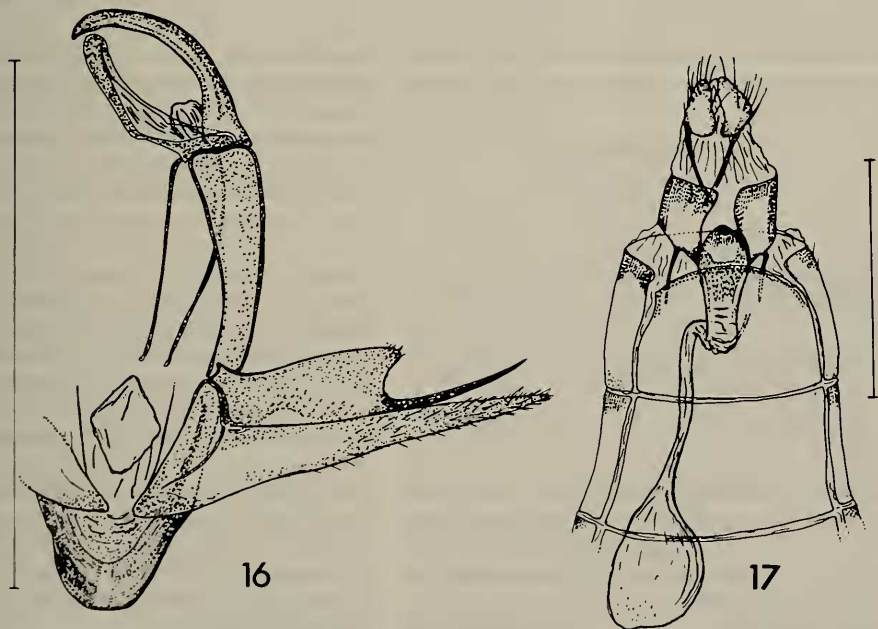
Forewings (fig. 6) with ground colour of whitish brown, discal region covered with scattered brown scaling. Basal and antemedial fasciae absent, although position of latter is marked on costa by one or two obscure white and black marks. Disc buffish brown. Postmedial fascia narrow, white, edged with dark brown, curved from costa, with slight zig-zag at about 0.8. Subterminal zone clouded with dark brown. Pair of black sub-marginal spots characteristic of genus situated at 0.6 and 0.8. Apical zone white, with a medial buffish yellow zone. Some yellowish patches are also present in the sub-costal region of the disc. Ventral surface dull, pale brown. Cilia buffish, with dark bases (most outer cilia missing in available specimen).

Hindwings pale brown, apical cilia with dark brown bases, otherwise also pale brown.

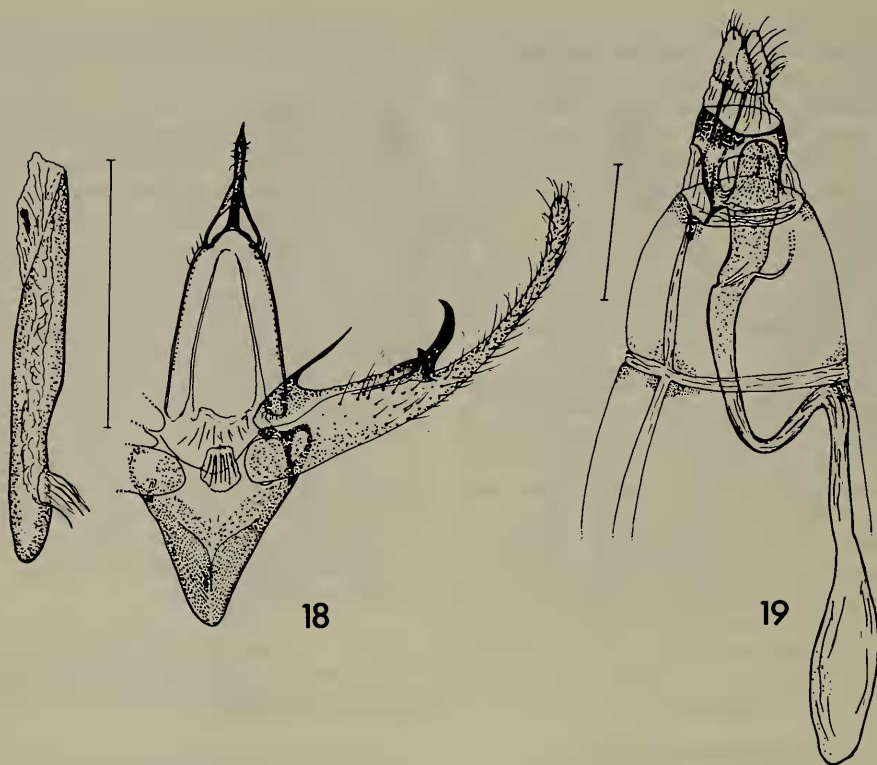
Wing expanse 16.5 mm.

Type. — Holotype ♂, N.E. India, Khasia, Aug. 1894 (nat. collr), Rothschild Beq. 1939—1, no abdomen (BMNH).

Remarks. — I describe this species, despite the missing abdomen, since it is clearly a new species of *Roxita* which could not be confused



Figs. 16, 17. Male and female genitalia of *R. adpersella*.



Figs. 18, 19. Male genitalia of *R. fletcheri*.

with other known members of the genus. Only the unique holotype has so far been collected.

Roxita szetschwanella
(Caradja) new combination
(figs. 10, 20, 21)

Crambus modestellus Caradja, 1927: 395 (praeoc.).

Culladia szetschwanella Caradja, 1931: 203.

Culladia szechwanella Caradja; Caradja & Meyrick, 1933: 140 (misspelling of *szetschwanella*).

Modestia szetschwanella (Caradja); Bleszynski, 1965: 64 (partim), pl. 2 fig. 17, pl. 34 fig. 17 (♂ genitalia), pl. 87 fig. 17 (♀ genitalia).

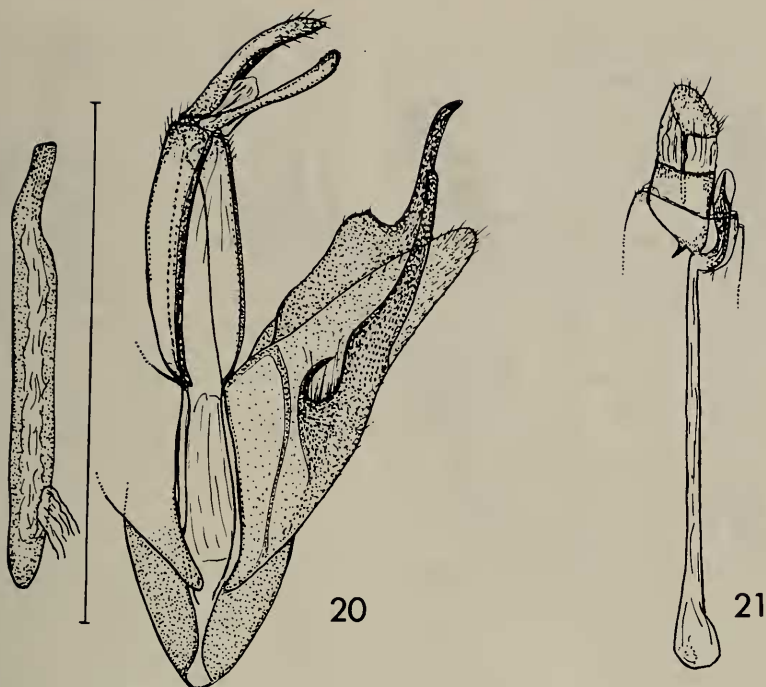
Modestia szetschwanella (Caradja); Bleszynski, 1970: 59.

External characters. — Described by Caradja (1927, 1931), briefly re-described, and illustrated in colour, by Bleszynski (1965, p. 64 & pl. 2 fig. 17). I also present fig. 10, provided for comparative purposes.

Male genitalia. — Fig. 20. Illustrated by Bleszynski (1965, pl. 34 fig. 17) redrawn and re-

described here, with re-interpretations. Uncus and gnathos about equal in length, sharply and bluntly pointed and curved ventrad and dorsad respectively. Tegumen simple. Saccus somewhat tapered in preparation, but probably rounded in reality. Vinculum an elongate triangular structure about $0.4 \times$ as wide as length of uncus. Juxta not recognized in preparation. Valva about $3 \times$ length of uncus ($4 \times$ if apical costal prong included). Costal region strong, massively sub-pyramidal at about 0.8, then terminating in apical prong, curved slightly posteriad, and about length of uncus. Valva proper apically and moderately tapered, with weak cucullus, and an introrse ventral fold, bearing a sub-basal curved prong at about 0.4 from base, and a much longer (nearly $1.5 \times$ length of uncus) flattened, gently tapered prong with rounded apex. Aedeagus about equal to length of valva, tubular, truncate, LMB ratio about 10:1, apical quarter slightly curved and scobinate.

Female genitalia. — Fig. 21. The paralectotype specimen (slide GU-2904-B1), stated by



Figs. 20, 21. Male and female genitalia of *R. szetschwanella*.

Bleszynski (1965) to be in the Antipa collection in Bucharest, could not be obtained for re-examination. Since this is the only known female, Bleszynski's figure is redrawn here. His drawing reveals relatively little detail, and the junction of the ductus seminais was not shown. The margin of the antrum however, can be seen to be extruded from the membrane posterior to the seventh sternite, and the base of the antrum is fused with the latero-anterior angles of the eighth tergite. The corpus bursae is asignate.

Types. — Lectotype ♂, China, Kwanshien, Szetschwan, Etikette coll., Muzeul G. Antipa, Bucharest. Also 4 ♂ and 1 ♀ paralectotypes, Bucharest. Holotype ♂ of *Crambus modestellus* Caradja (praeocc.), same locality as *szetschwanella*, dated 19.vii.—, also in Bucharest.

Material examined. — W. China, 6 ♂, Mt. Omei, 4,000 ft., —vii.32; 1 ♂, same data but —viii.32. One of former lacks left wings and has genitalia prep. BM pyral. 5468 (GU—964—B1) (BMNH). This latter specimen has been used for a venation preparation. Another ♂ bears a label "Gewalt von Dr. F. Gregor fur Micr. Pal.", and is the specimen figured by Bleszynski (1965, pl. 2 fig. 17).

Remarks. — Closely related to *R. bipunctella* of Taiwan, but the forewing of *szetschwanella* is proportionally more slender, with more white in the distal position of the apical triangle. The female of *szetschwanella* lacks the swollen subostiolar sac present in *bipunctella* and the costal prong of the male valva is quite slender and not recurved in the former species.

Roxita bipunctella

(Wileman & South) new combination
(figs. 11, 22, 23)

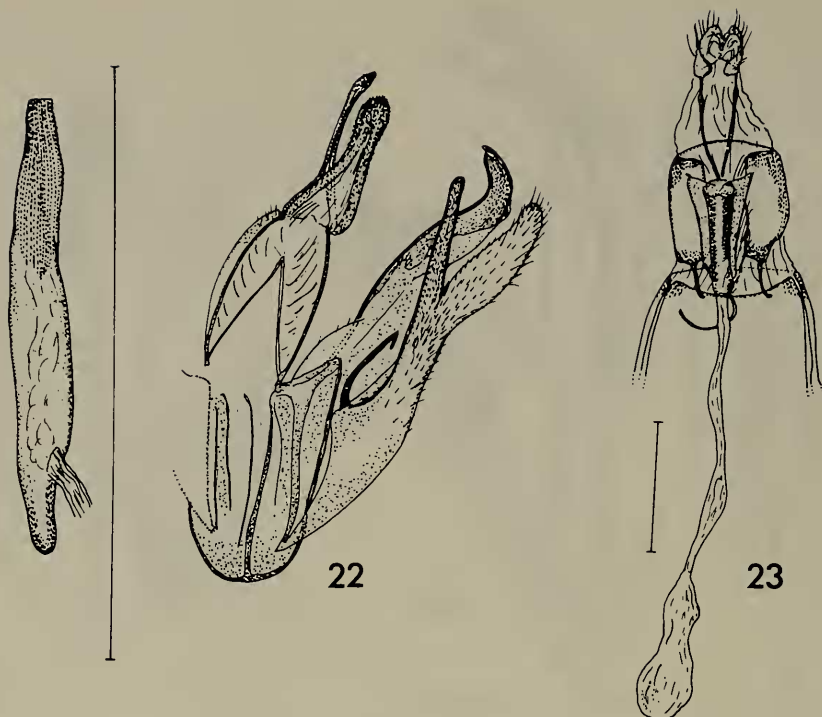
Culladia bipunctella Wileman & South, 1917: 148.

Culladia bipunctella Wileman & South; Bleszynski & Collins, 1962: 288.

Modestia bipunctella Wileman & South; Bleszynski, 1970: 58.

External characters. — Briefly described by Wileman & South (1917), re-described and illustrated here (fig. 11). Labial palpi 1.25 × head length, pale brown, whitish on inner surfaces. Thorax, legs, pale brown.

Forewings with whitish ground colour, baso-posterior region clouded with buff and darker brown scales. Costa with broad chocolate band to about 0.6 from base, basal fascia obsolete ex-



Figs. 22, 23. Male and female genitalia of *R. bipunctella*.

cept for dark blotches, from which a neural streak of dark brown, expanded distally, runs from base to about 0.4 in disc. "Antemedial" fascia broad, whitish, invaded by brown scaling, edged distally with an obscure, broken, thick brown line, zig-zagged at 0.3 from costa. Fascia displaced to beyond medial position in this species. True postmedial fascia narrow, clear white, edged with dark brown, almost touching termen at 0.3, zig-zagged sharply at 0.7. Reniform stigma absent, proximal portion of disc with scattered dark brown scaling, a pair of silvery streaks from angle of postmedial fascia at 0.3, the anterior-most extended in a dark streak across disc. Another pale streak, edged with dark brown, erupts from the angle of postmedial fascia at 0.7. Subterminal region dark brown, as is apical sector, except for a marginal white patch. The two black spots in the subterminal zone, characteristic of this genus, are distinct at 0.5 and 0.7. Ventral surfaces mid-brown with apical and terminal markings repeated from dorsal surface. Cilia pale brown with dark bases.

Hindwings pale brown, both above and below.

Wing expanse 12-15 mm.

Male genitalia. — Fig. 22. Uncus narrow in ventral aspect, laterally flattened, curved ventrad. Gnathos slightly shorter than uncus, apically rounded, and spatulate, minutely spinose, curved slightly dorsad. Tegumen simple, with relatively weak margins. Vinculum narrow, about $0.3 \times$ as wide as uncus is long. Saccus broad, rounded. Juxta not recognized in preparation. Valva complex, about $2.5 \times$ length of uncus, with strong costa terminating in a broad apical prong, curved dorso-intorsely. Valva proper with ventral fold, which has a sub-basal curved spine, apically hooked, about half length of uncus, and a broad, apically rounded, nearly straight, flattened protuberance, tapered only slightly from its base, arising at about 0.5. Segregation of valva proper and costal region extends to about 0.6 from base. Aedeagus equal in length to valva, LMB ratio about 8 : 1, apical third scobinate or minutely spinose. Cornuti absent.

Female genitalia. — Fig. 23. Anal papillae weakly fused dorsally, flattened, almost clog-shaped in profile, posterior apophyses about $2.5 \times$ length of papillae. Eighth tergite about as long as posterior apophyses, anterior apophyses reduced to short, curved protrusions barely $0.3 \times$ length of posteriors. Antrum a complex tube, lamella ante-vaginalis drawn out into a pair of lateral flanges on each side of the posterior ductus, and curving dorso-introtrorsely to fuse through moderately sclerotized but flexible extensions to the ventro-anterior angles of the eighth tergite. Eighth sternite absent, or incorporated with lamella postvaginalis into dorsal wall of antrum. Ductus bursae about $4 \times$ length of posterior apophyses, with ductus seminalis joining at base of antral region. Corpus bursae asinate.

Types. — Lectotype: ♂, Taiwan. White oblong label "Kanshirei, Formosa, 1,000 ft., 13.vi.1906 (A. E. Wileman); faded white oblong "Culladia bipunctella sp.n. Type male". Purple-bordered circular label "lectotype", red-bordered label "Type", and blue label "abdomen missing" (BMNH). Paralectotypes: 4 ♂ Taiwan, 3 as above but 12.vi.1906, BM pyral. 7437; 16.ix.1906, BM pyral. 7485; and 15.ix.1906; one from Koannania, 15.ix.1906 (all BMNH).

Other material examined. — Taiwan, 1 ♂, 1 ♀, Suisha, 2.vi.1934 (L. Gressitt) (BMNH), BM pyral. 16812 ♀.

Remarks. — Presently known only from Taiwan, flight period known to include February, June and September. Differs from *szetschwanel-la* only in minor (but distinctive) character proportions in the male genitalia, but shows an apomorphic character (sub-antral sac) in female genitalia.

Roxita apicella new species (figs. 4, 12, 13)

External characters. — Labial palpi about $1.5 \times$ head length, silvery grey. Head yellowish, frons rounded, thorax, legs and abdomen yellowish brown with scattered darker scaling.

Forewings (fig. 4) with bright orange-brown ground colour. Base of wing blackish brown, position of basal fascia represented by black streak. Antemedial fascia broad, dull white, flanked irregularly by dark brown, sharply angled at 0.2. Discal region with an indistinct, quadrate yellowish reniform. Postmedial fascia relatively broad, white, angled sharply at about

0.3 and interrupted in the subapical region, edged thickly with blackish brown. Apical region plain orange-brown, bounded at its base by a segment of the interrupted white postmedial fascia. The apex is characteristically turned dorsad and sharply pointed or "tufted". Sub-apical indentation of the termen very distinct, and filled with white cilia. Cilia otherwise dark brown except at 0.8 from apex, where margin has a tertiary indentation filled with shining brown cilia. Margin bears a pair of indistinct black spots at 0.5 and 0.6. Ventral surface mottled brown.

Hindwings and outer cilia dark brown, inner cilia pale brown, ventral surfaces mottled brown.

Wing expanse 13–14 mm.

Male genitalia. — Uncus simple, tapered, pointed. Gnathos about $0.75 \times$ length of uncus, tapered sharply at 0.4 from base, pointed apical element nearly cylindrical to tip, slightly setulose. Tegumen simple, but with strong dorsal margins. Vinculum triangular, fused with base of valval costa. Saccus large, massive, anteriorly rounded. Juxta a narrow, horizontal crescentic plate. Valva very complex; elongate and narrowed, valva proper apically rounded and spatulate with weak cucullus. Sub-basal margin of valval costa and valva proper bears a large, flat, projecting lobe with a crenellate margin. Costal lobe separate from main valva from about 0.6, tapering to a strong, pointed apical prong nearly twice length of uncus and curved dorsad. The area of the costal/valva junction bears a number of small setae, and three very long, expanded, pointed, ribbon-like flattened setae, each slightly larger than costal prong, giving the genitalia a deceptively endotrichine appearance. Aedeagus simple, tubular, rather truncate, about $0.8 \times$ length of valva, LBM ratio about 10 : 1, with a single irregular sub-apical cornutus.

Female genitalia. — Fig. 13. Anal papillae weakly fused dorsally, posterior apophyses about $2 \times$ length of papillae. Eighth tergite virtually fused in ventral midline to margins of ostiolar region. Anterior apophyses reduced, only about $0.5 \times$ length of posteriors. Antrum a narrow tube, more or less circular in cross-section, lamella ante- and postvaginales developed and fused to antrum to surround and enclose it ventrally and dorsally as elongate overlapping shields. Subantral region bearing an irregular "fatty" looking sheath, staining blue with chlorazol black. Ductus bursae about $6 \times$ length of posterior apophyses in total, with ductus semi-